Narratives of UC Berkeley Women Mathematicians

Terra Neff, Maria L. Hjelm, Sheila Humphreys

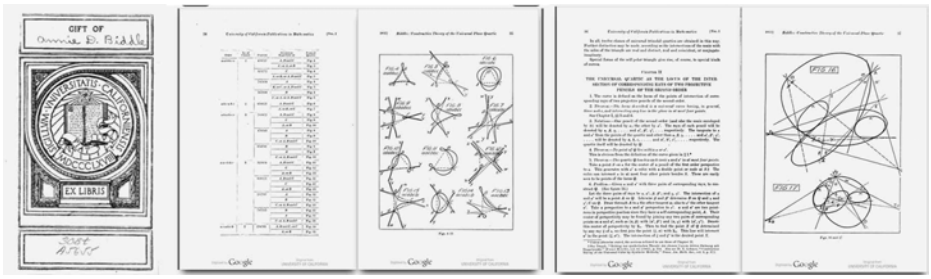
Timeline

1911 - Annie Dale Biddle Andrews was at the vanguard when she received her B.A. from the University of California in 1908 and when she was the Math Department's first woman (and only the third student) to earn a Ph.D.

Annie Dale Biddle Andrews
Professor Emerita, Mathematics: Berkeley
1885-1940

Annie Dale Biddle Andrews was at the vanguard when she received her B.A. from the University of California in 1908 and when she was the Math Department's first woman (and only the third student) to earn a Ph.D. She wrote her thesis, entitled "Constructive theory of the unicursal plane quartic by synthetic methods," supervised by Derrick Norman Lehmer and Mellen Haskell. In 1914, the University of California appointed Andrews as Teaching Fellow. After she married Mr. Andrews, an Irish lawyer, Annie Biddle Andrews raised two children. Her academic horizon narrowed because of attitudes against married women. She was an instructor in mathematics at UC Berkeley off and on between 1915 and 1932, when her appointment was terminated. She had taught Mathematical Theory of Investment; Plane Analytic Geometry and Differential Calculus; Solid Analytic Geometry, Integral Calculus, and Infinite Series; College Algebra; and Introduction to Projective Geometry.

Courtesy of Maria Hjelm and Sheila Humphrey



From HathiTrust, Biddle, A. Dale. (1912). Constructive theory of the unicursal plane quartic by synthetic methods. Berkeley: University of California press.

1916 - Pauline Sperry was appointed Instructor in Mathematics in 1923 and promoted to Assistant Professor, becoming the first female tenure-track mathematics faculty member and was appointed Associate Professor in 1931. During her academic career Sperry advised five doctoral students and twelve descendants.

Pauline Sperry

Associate Professor Emeritus, Mathematics: Berkeley

1885-1967

Pauline Sperry was born in Peabody, Massachusetts on March 5, 1885. In 1916, Sperry received her Ph.D. degree in mathematics from the University of Chicago and accepted an instructor position in mathematics at the University of California, Berkeley. After five years at Berkeley, Sperry was appointed Assistant Professor, becoming the first female tenure-track mathematics faculty member, and was appointed Associate Professor in 1931. During her academic life Sperry advised five doctoral students and twelve descendants.

Under the guidance of Ernest Julius Wilczynski, Sperry's doctoral thesis, "Properties of a certain projectively defined two-parameter family of curves on a general surface", drew on his work as the founder of the American school of projective differential geometry.

At the height of McCarthyism, the Board of Regents required university employees to sign a loyalty oath. When Sperry and others refused, they were fired in 1950. In the case Tolman vs. Underhill the California Supreme Court ruled in 1952 that the loyalty oath was unconstitutional and reinstated those who refused to sign. Sperry was reinstated with the title Emerita Associate Professor—but she chose to retire.

Courtesy of Maria Hjelm, Sheila Humphreys and Tera Neff

1923 - Sophie Levy Macdonald was the second woman to be hired in the Mathematics Department (Assistant Professor in 1925, Associate Professor in 1940, and Professor in 1949). As a faculty of the Mathematics Department she taught generations of students.

Sophie Levy Macdonald
Professor Emerita, Mathematics: Berkeley
1888-1963

Sophia Levy was the daughter of California pioneers. Levy developed an interest in astronomy as an undergraduate at Berkeley, where she earned a BS in 1910 and PhD in 1920. For the bulk of her career, however, Levy belonged to the faculty in mathematics at Berkeley., While pursuing graduate study she was hired as an astronomy assistant from 1910-1914. After that she worked in two administrative posts, assistant to the dean of the Graduate Division and Secretary to the California State Board of Education for the Commission of Credentials. She was appointed as astronomy instructor in 1921. Levy contributed many papers in theoretical astronomy. Because of her ability in mathematical analysis, she was hired as an instructor in mathematics at Berkeley in 1923. Eventually Levy rose to full professor of mathematics in 1949, twenty-six years later. During World War II, Levy directed the mathematics instruction for the Army Specialized Training Program at Berkeley. She taught courses on antiaircraft gunnery and even published a text, Introductory Artillery Mathematics and Antiaircraft Mathematics. Levy was deeply committed to improving the quality of mathematics instruction at the secondary school level, and assumed leadership roles in the training of math teachers and prospective teachers. She advised the state of California on math curriculum for the California Committee for the Study of Education in California public schools. She served as chair and sectional governor of the recently organized Northern California Section of the Mathematical Association of America. In 1941, the Northern California and Southern California Sections established a Joint Committee on Mathematical Education under her chairmanship "to study means of strengthening the program of mathematics in schools and colleges." Levy developed a summer session for math teachers to meet state requirements and published articles in The Mathematics Teacher on the teaching of mathematics in the schools.

Levy chose to defer her marriage to a colleague in the math department (John McDonald) until he retired in 1944 because, under nepotism rules, one of the two would have had to resign from the faculty had they married. Anti-nepotism rules, which were not dropped until the 1970s, often had the effect of inhibiting women's careers.

Courtesy of Sheila Humphreys, from "Women Pioneers in Science and Math at Berkeley"

1948 - Julia Robinson rose to prominence in the field of mathematics for her successive publications to solve “Hilbert's tenth problem”; this terminology refers to a list of 23 problems proposed at the International Congress of Mathematicians held in 1900 by David Hilbert, generally acknowledged to be the greatest mathematician of his time.

Julia Robinson

Professor Emerita, Mathematics: Berkeley

1919-1985

“Julia was loved and admired by her colleagues. Her gentle manner, quiet sense of humor, idealism and integrity, and her obvious and contagious love of mathematics won for her a wide circle of friends around the world.”
- Elizabeth Scott, Marina Ratner, John Addison, Leon Henkin, Derrick Lehmer

Julia Hall Bowman Robinson is known for her still relevant contributions to the solution of Hilbert's 10th problem - joint work with Martin Davis and Hilary Putnam and later completed by Yuri Matiyasevich. Their solution indicates that there is no algorithm to determine the solvability of polynomial equations in integers. At age 16, Robinson started her mathematical journey at San Diego State University, and three years later, she decided to transfer to the University of California Berkeley to complete her B.A.

In her first semester at Berkeley, Robinson enrolled in five upper division courses. One of those courses was number theory, taught by Raphael M. Robinson. Robinson received her B.A. in mathematics in 1940, and a year later she married Raphael. After graduating, Robinson continued her graduate studies at Berkeley. While in her graduate program, Robinson was employed as a teaching assistant in the Mathematics Department, and later as a statistics lab assistant where Robinson published her first paper, “A Note on Exact Sequential Analysis.”

In 1948, under the supervision of Alfred Tarski, Robinson completed her Ph.D. dissertation titled "Definability and Decision Problems in Arithmetic," hence, earning her Ph.D. degree.

In 1975, Robinson was the first female mathematician elected to the National Academy of Science, and immediately after the Department of Mathematics learned about this unprecedented award Robinson was offered a full Professor appointment at Berkeley. In 1983, she was the first woman elected as president of the American Mathematical Society. Some of her other honors include: Noether Lecturer in 1982, first woman elected as president of the American Mathematical Society, the MacArthur Foundation Fellowship in 1983, and election to the American Academy of Arts and Sciences in 1983.

Courtesy of Maria Hjelm and Tera Neff

1951 - Elizabeth Scott earned her B.A. in Astronomy in 1939, and in 1949 her Ph.D. in Astronomy from the University of California, Berkeley. By 1951 Scott obtained a position as Assistant Professor in the Mathematics Department at Berkeley. When statistics split from the mathematics in 1955 to become the new Statistics Department, Scott moved to the statistics faculty as the first woman professor. In 1957 she noted a flaw in the observation of galaxy clusters, which is now referred to as the Scott effect. The Committee of Presidents of Statistical Societies awards an annual prize in her honor, the Elizabeth L. Scott Award, for "fostering opportunities in statistics for women."

Elizabeth Scott

Professor Emeritus, Statistics: Berkeley

1917-1988

Elizabeth Scott was born in Fort Sill, Oklahoma, on November 23, 1917. Scott earned her B.A. in Astronomy in 1939 and in 1949, her Ph.D. in Astronomy from the University of California, Berkeley. By 1951, Scott obtained a position as assistant professor in the Mathematics Department at Berkeley. When statistics split from the mathematics in 1955 to become the new

Statistics Department, Scott moved to the statistics faculty as the first woman professor. Scott eventually served as a strong Chair of Statistics, and spent much of her time doing astronomy research, in which she incorporated and expanded the use of statistics. In 1957 she noted a flaw in the observation of galaxy clusters, which is now referred to as the Scott effect. The Committee of Presidents of Statistical Societies awards an annual prize in her honor, the Elizabeth L. Scott Award, for "fostering opportunities in statistics for women."

Courtesy of Maria Hjelm, Sheila Humphreys and Tera Neff

1975 - Marina Ratner was educated in Moscow, obtained her doctoral degree at the Moscow State University, emigrated to Israel in 1971, and joined the Berkeley Mathematics Department in 1975. Her work was mainly in ergodic theory and its connections with other parts of mathematics, and earned many honors, including the Ostrowski prize, and the John J. Carty Award. Furthermore, she was a plenary speaker at the International Congress of Mathematicians and a member of the National Academy of Sciences. Beyond her achievements in mathematics, Ratner was also an outstanding and beloved teacher and cared deeply about mathematics education.

Marina Ratner
Professor Emerita, Mathematics: Berkeley
1938-2017

Marina Ratner was born in Moscow, Russia to a Jewish family of scientists who instilled in her from a young age a love of mathematics. From 1956, Ratner studied mathematics at Moscow State University (MSU) and became particularly interested in probability theory, inspired by A.N. Kolmogorov and his group. Upon graduating from Moscow State, Ratner joined Kolmogorov's applied mathematics group for four years until she returned to MSU to complete her Ph.D. thesis. She completed her Ph.D. thesis, titled "Geodesic Flows on the Unit tangent Bundles of Compact Surfaces of Negative Curvature" in 1969.

In 1971, Ratner emigrated from the Soviet Union to Israel to lecture at the Hebrew University, and in 1975, she accepted a faculty appointment in the Mathematics Department at the University of California, Berkeley. Marina Ratner is best known for her proofs of conjectures dealing with unipotent flows on quotients of Lie groups made by S.G. Dani and M. S. Raghunathan. Ratner received several honors in recognition of her research in Lie groups and other accomplishments. Some of her awards include the John J. Carty Award for the Advancement of Science, an invitation to deliver a plenary lecture at the International Congress of Mathematicians, the Ostrowski Prize, and an election to the National Academy of Sciences.

Courtesy of Maria Hjelm and Tera Neff

1981 - Jenny Harrison has had several noteworthy women students, including Dame Angela McLean, FRS, Professor of All Souls College in Oxford; Julie Mitchell, Director of the Biosciences Division at Oak Ridge National Laboratory; Mary Lou Zeeman, Chair of Mathematics at Bowdoin College; Kaavya Valivetti, 2016 winner of the Berkeley Medal; and Khalilah Beal, Lecturer in the Mathematics Department at UCB.

Jenny Harrison
Professor, Mathematics: Berkeley

Jenny Harrison was born in Atlanta GA on Feb 4, 1949, and grew up in Tuscaloosa AL. She was a music major at the University of Alabama, but her philosophy courses convinced her that mathematics was the best tool to reliably solve mysteries of physics. In 1971, a Marshall Scholarship funded her undergraduate studies in mathematics at the University of Warwick, England. Four years after her arrival, she was awarded a PhD under the guidance of Sir Christopher Zeeman and Larry Marcus. Her thesis Unsmoothable Diffeomorphisms provided counterexamples to the Denjoy Conjecture. She subsequently became a postdoc at the Institute for Advanced Study where Hassler Whitney and John Milnor were her advisers. In 1977, she

was appointed Fellow by the Miller Institute at UC Berkeley and an Assistant Professor in 1978. She concurrently held a tenured position at Oxford University, England, but chose to return to Berkeley in 1981. When she was denied tenure in 1986 due to sexual harassment and subsequent retaliation, the Berkeley Dean Leonard Kuhi asked her to sue the university to help uncover evidence of gender bias and sexual harassment in the Mathematics Department. Therein began a seven-year lawsuit which made international news. In 1993, the lawsuit culminated in a victory when a panel of seven mathematicians, chosen from a list agreed by all parties to be fair, unanimously voted for tenure as a full professor. By this time, she had proved a general version of Stokes' theorem which extended the classical result for smooth surfaces to rough domains, such as fractals. Recently, she and Harrison Pugh proved a general version of Plateau's Problem by way of a novel axiomatic approach and which extended prior results. She has received a number of awards, including a major award from the foundation FQXi (Foundational Questions in Physics), an NSF Visiting Professorship for Women at Yale University, and a Miller Professorship at Berkeley. She has had several noteworthy women students, including Dame Angela McLean, FRS, Professor of All Souls College in Oxford; Julie Mitchell, Director of the Biosciences Division at Oak Ridge National Laboratory; Mary Lou Zeeman, Chair of Mathematics at Bowdoin College; Kaavya Valivetti, 2016 winner of the Berkeley Medal; and Khalilah Beal, Lecturer in the Mathematics Department at UCB.

Courtesy of Tera Neff

1991 - Concha Maria Gomez is Italian and Cuban-American, and has dedicated her career to finding ways to make mathematics more accessible for minorities and women. In 1991 Gomez co-founded the Noetherian Ring Which is a group focused on supporting women in mathematics. Currently, Gomez teaches at Diablo Valley College where she works to create a supportive environment for Latinx students.

1998 - **Zvezdelina Stankova** attended Harvard University as a doctoral student, and earned her PhD in 1997. Her dissertation, entitled "Moduli of Trigonal Curves," was supervised by Joe Harris. In 1998 Stankova founded and still directs the Berkeley Math Circle, a program that aims at drawing kids to mathematics, preparing them for mathematical contests, introducing them to the wonders of beautiful mathematical theories, and encouraging them to undertake future careers linked with mathematics, whether as mathematicians, mathematics educators, economists, or business entrepreneurs, which she still directs. She is professor of Mathematics at Mills College & UC Berkeley.

2000 - **Vera Serganova** earned her bachelor's degree at Moscow State University, and earned her Ph.D. in Mathematics at Saint Petersburg State University in 1988. Her dissertation entitled, "Automorphisms and Real Form of Complex Finite-Dimensional Lie Superalgebras," supervised by Dmitry Leites and Arkady L'vovich Onishchik. Serganova is well known for the Gelfand-Serganova Theorem published by Serganova and Israel Gelfand in 1978 as part of her research originating the concept - geometric characterization of a Coxeter matroids.

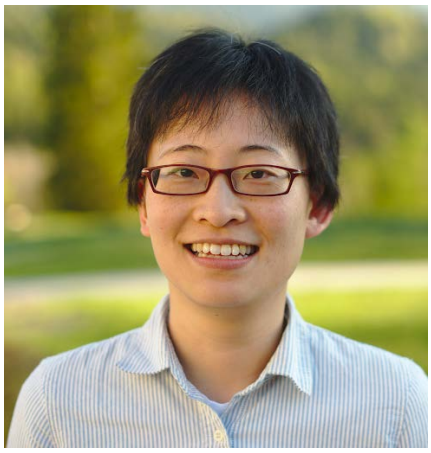
During her career Professor Serganova has presented twice at the International Congress of Mathematicians; first invitation in 1998 as a plenary speaker in Lie Groups, and later in 2014 for a plenary. Professor Serganova's current research interest is in super-representation theory, and she currently holds an appointment at UC Berkeley, Department of Mathematics.

2004 - Olga Holtz held a Morrey Assistant Professorship at the UC Berkeley, Department of Mathematics from 2004 to 2007. Holtz received the European Mathematical Society Prize in 2008 and won the Sofia Kovalevskaya Award in 2016, and became a Professor of Applied Mathematics at the Technical University Berlin while holding an Associate Professor appointment, then later Professor of Mathematics at UC Berkeley.

2009 - Lauren Williams graduated magna cum laude from Harvard University in 2000 with an A.B. in mathematics. Williams earned her P.h.D. in 2005 at the Massachusetts Institute of Technology with a dissertation entitled, “Combinatorial Aspects of Total Positivity” advised by Richard P. Stanley. Williams joined the mathematics department in 2009 as an assistant professor, and was promoted to associate professor in 2013, then full professor in 2016. With

colleagues O. Mandelshtam and Sylvie Corteel, in 2018 Williams developed a new characterization of both symmetric and nonsymmetric Macdonald Polynomials using the combinatorial exclusion process. Currently, Williams is a professor at Harvard University.

2010 - Bianca Viray earned her Ph.D. from the University of California, Berkeley in 2010; her advisor was Bjorn Poonen. Shortly after, Viray became a Tamarkin Assistant Professor and National Science Foundation (NSF) Postdoc at Brown University. She received an NSF career award in 2016. Currently, she is a professor at University of Washington.



2012 - Melody Chan, as a preschooler, was inspired by the music of Yo-Yo Ma and shows like Sesame Street to become a musician. By the time Chan started her high school freshman year in Scarsdale, New York, she was the youngest artist in the 1997 Young Artist Competition of the Sarah Lawrence College Chamber Orchestra. Chan earned her B.A. in Computer Science and Mathematics from Yale University where she graduated summa cum laude in 2005, and three years later in 2008 Chan completed her master's degree at Yale University. Later, Chan earned her doctorate degree in 2012 at the University of California, Berkeley. Her dissertation,

entitled "Tropical curves and metric graphs," was supervised by Bernd Sturmfels. Chan held an NSF Postdoctoral Fellowship at Harvard University, and She is currently an Assistant Professor at Brown University, a Sloan Research Fellow, has recently won an NSF CAREER Award, and received the AWM-Microsoft Research Prize in Algebra and Number Theory 2020 award. Beyond the bounds of her significant scientific achievements, Chan has adopted leadership roles to advocate for participation of women in research. Currently, Chan serves as Faculty Advisor for the Horizons Seminar at Brown University, facilitating workshops or talks on topics of diversity, community, and career development for young mathematicians while organizing the peer Mentoring Network for women in mathematics.

2013 - Kahlilah Beal earned her bachelor's degree in chemistry and mathematics from Howard University in 2002. In 2013 Beal earned her Ph.D. from the University of California, Berkeley with a dissertation entitled "Viscosity Solution Methods in Risk Analysis," supervised by Craig Evans. Beal is currently a lecturer for the University of California, Berkeley while she holds a tenured position in mathematics at the College of Alameda.

2018 - Born in France, Corteel earned her engineering degree in 1996 from the University of Technology of Compiègne, and a Master's degree from North Carolina State University in 1997, where she worked with Carla Savage. Later, she was awarded a Ph.D. from University of

Paris-Sud in 2000. Her dissertation, which focuses on enumerative and algebraic combinatorics, was supervised by Dominique Gouyou-Beauchamps. Corteel was appointed as a research director at The French National Centre for Scientific Research. She worked at the Universite Paris-Diderot (Paris 7). Since 2019, Sylvie Corteel has been a mathematics professor at the University of California, Berkeley.

2019 - Catherine Cannizzo earned her Ph.D. at the University of California, Berkeley in 2019. Advised by Denis Auroux , she wrote a dissertation entitled “Homological mirror symmetry for the genus 2 curve in an abelian variety and its generalized Strominger-Yau-Zaslow mirror”. As a Berkeley graduate student Cannizzo was deeply involved with NRing. Cannizzo is also a member of the LGBTQ+ community and loves to dance ballet in her free time. Currently, Cannizzo is a Research Assistant Professor at the Simons Center for Geometry and Physics at Stony Brook University.

Acknowledgments

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Important sources for the Narratives of UC Berkeley Women Mathematicians include the University of California In Memoriam series of the UC History Digital Archives, Moore, Calvin. Mathematics at Berkeley: A History. Wellesley: A.K. Peters, 2007.

Webpages

- These webpages were created by departmental staff.

Images

- Photos are courtesy of UC Berkeley Mathematics; photograph by George M. Bergman, The Bancroft Library, University of California, Berkeley.
- Julia Robinson, poster series, print 2021. Courtesy of Madeline Brandt and Claire Mirocha and collaborators: Mariel Supina, Rahul Dalal, and Rockford Sison. Accessed March, 3 2021.